



SOVEREIGN CONSULTING INC.
AN ENVIRONMENTAL SERVICES FIRM

Addressing Assumptions & Misconceptions About Living Shorelines

2016 Delaware Wetland Conference

Douglas Janiec

***Natural Resources Program Manager
& Senior Restoration Ecologist
Sovereign Consulting Inc.***

REPRESENTED LIVING SHORELINE & ENERGY ATTENUATION THROUGHOUT THE NORTHEAST (2014 -2015)



- D. Janiec. 2015. Natural Resilience and Living Shorelines: What are they and how do they work? 2015 Emergency Preparedness and Hazmat Response Conference, King of Prussia, **PA**. Workshop. October 23, 2015.
- D. Janiec. 2015. Shoreline Restoration and Natural Shoreline Resilience Using Standard and Hybrid Energy Attenuating Living Shorelines. Maryland-District of Columbia Utilities Association, 2015 Environmental Conference, Cambridge, **MD**. October 22, 2015.
- D. Janiec. 2015. Lessons Learned with Energy Attenuating Hybrid Living Shorelines. **New Jersey** Living Shoreline Workshop. June 10, 2015.
- D. Janiec. 2015. Restoration Project Management, Pit-falls and Lessons Learned. Presented to the Joint Base McGuire- Dix-Lakehurst (MDL), **NJ**. March 18, 2015.
- D. Janiec. 2015. Introduction to Sovereign & Technical Talk on Natural Shoreline Restoration and Resilience. Presented to the USFWS, Chesapeake Marshlands NWR Complex, **MD**. March 4, 2015.
- D. Janiec. 2015. A Talk on Waves, Wave Attenuation & Hybrid Living Shorelines. The State of **Delaware** Living Shoreline Training Workshop. February 26, 2015.
- D. Janiec. 2015. Energy Attenuation & Hybrid Living Shorelines: A Viable Tool for Coastal Resilience. Hot Topic Session, Delaware Estuary Science & Environmental Summit "Balancing Progress & Protection – 10 Years of Science in Action." January 28, 2015.
- D. Janiec. 2015. Panel Discussion. Monitoring Standards for Tidal Wetland Enhancement Projects. Special Session, Delaware Estuary Science & Environmental Summit "Balancing Progress & Protection – 10 Years of Science in Action." January 28, 2015.
- D. Janiec. 2015. Living Shoreline Treatments, Tactics, & Techniques in the Delaware Region. Restoration I Session, Delaware Estuary Science & Environmental Summit "Balancing Progress & Protection – 10 Years of Science in Action." January 27, 2015.
- D. Janiec. 2014. Inland Bays, Highlighted Topic No. 1: Management of Sediments for Improved Estuary Water Quality. Speaker on behalf of the Delaware Center for the Inland Bays, A Tale of Three Estuaries Conference, 4th Annual DEAWRA Symposium & 53 Annual WRA-DRB Conference, **DE**. November 12, 2014.
- D. Janiec. 2014. Wave Energy Attenuation. Guest Speaker at: Water Resources Association of the Delaware River Basin, Annual Board Meeting and Award Dinner. **PA** April 16, 2014.
- D. Janiec. 2014. Wave Attenuation Devices: A Linchpin to Maximized Coastal Resiliency and Ecological Function. Keynote Speaker at: Hampton Beach Coastal Erosion Control Workshop, **NH**. Know H2OW. April 10, 2014.
- D. Janiec. 2014. Wave Attenuation Devices: A Linchpin to Maximized Coastal Resiliency and Ecological Function. Keynote Speaker at: Cape Cod Coastal Erosion Control Workshop, **MA**. Know H2OW. April 9, 2014.
- D. Janiec. 2014. Wave Attenuation Devices: A Linchpin to Maximized Coastal Resiliency and Ecological Function. Keynote Speaker at: **Rhode Island** Coastal Erosion Control Workshop, Know H2OW. April 8, 2014.
- D. Janiec and W. Young. 2014. Hybrid Living Shorelines: A Systematic Approach to Maximized Coastal Resiliency and Ecology. Plenary Speaker at: Society of Ecological Restoration (SER) Mid-Atlantic Conference. March 21, 2014, **PA**.





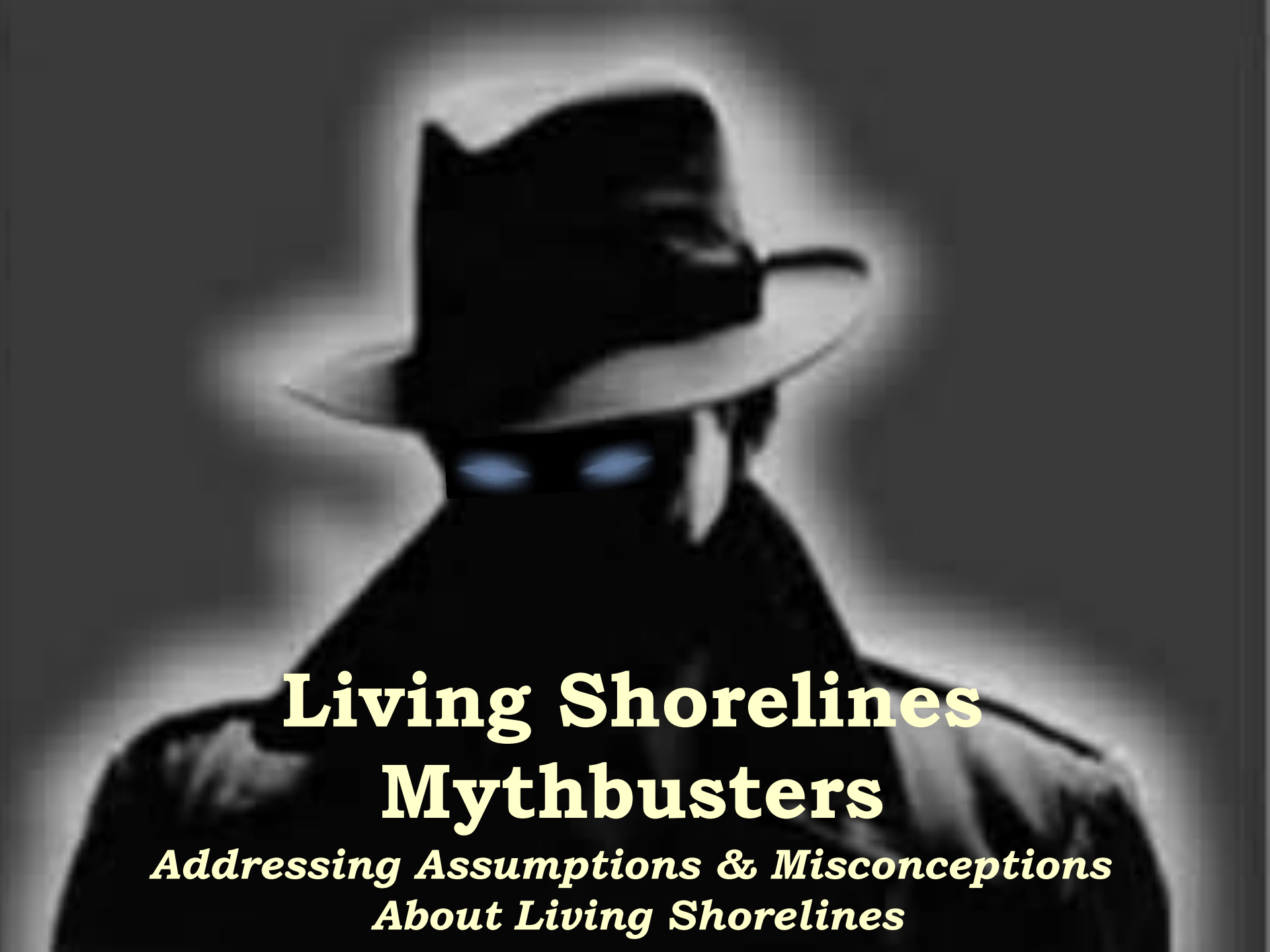
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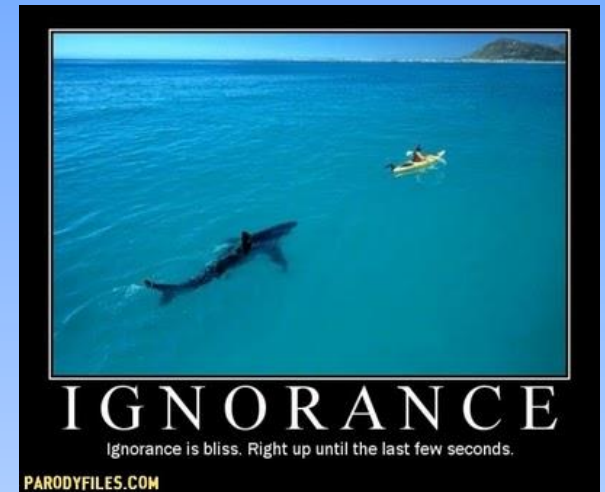
Living Shorelines Mythbusters

***Addressing Assumptions & Misconceptions
About Living Shorelines***

REOCCURRING ASSUMPTIONS & PRECONCEPTIONS ABOUT LIVING SHORELINES = **MYTHS OR FACT**

How/why do these occur?

- Ignorance
- Competition
- Perspective
- Monkey See Monkey Do



Overdressed Scientists

Engineers (casual Friday)



If I see it on the internet, it must be true.



#1 – A HYBRID ATTENUATING LIVING SHORELINE IS JUST ANOTHER TYPE OF BREAKWATER

- **Monster Issue**
- **Living Shorelines need to be looked at relative to how they functionally interact with wave energy.**

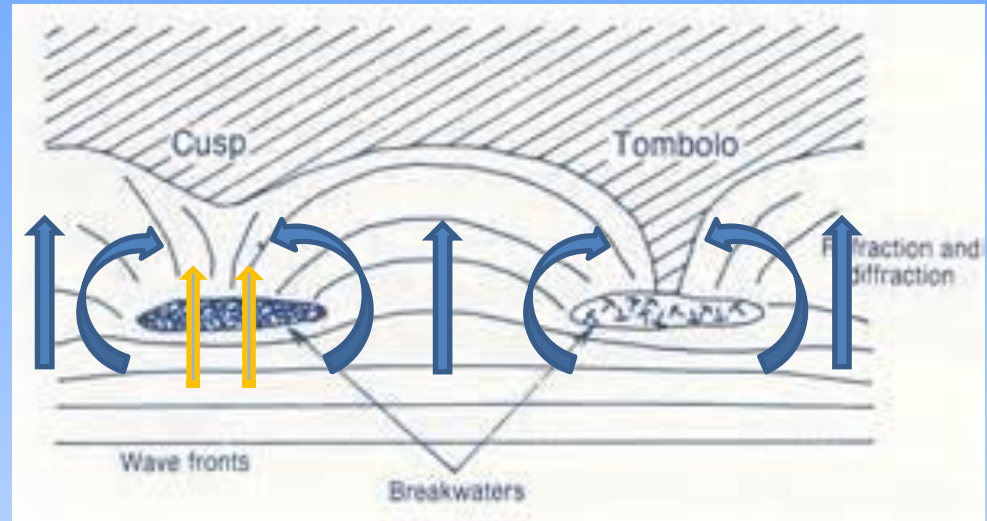


#1 – A HYBRID ATTENUATING LIVING SHORELINE IS JUST ANOTHER TYPE OF BREAKWATER

- Breakwaters provide a linear barrier to *redirect (manipulate) concentrated wave energy*.
- New hybrid attenuating living shoreline *allows the wave to pass through the structure(s) as it attenuates (breaks up) the wave energies and creates a destructive wave environment*.



#1 – A HYBRID ATTENUATING LIVING SHORELINE IS JUST ANOTHER TYPE OF BREAKWATER



- Erosion Patterns (not accretion patterns).
- Although some attenuation occurs, much of the remaining energy is concentrated.



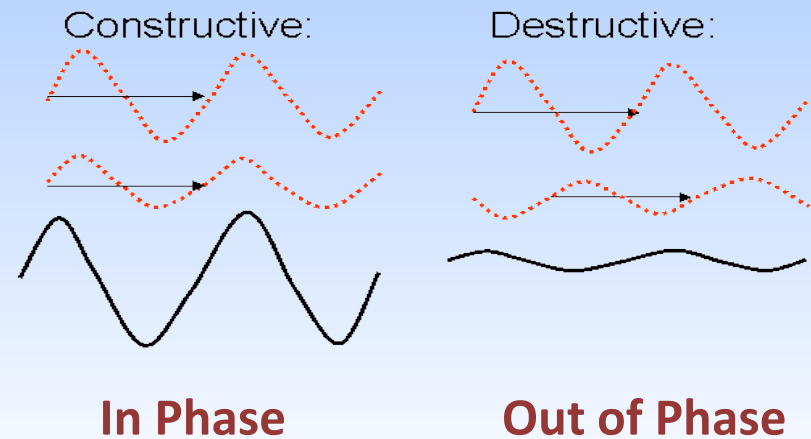
#1 – A HYBRID ATTENUATING LIVING SHORELINE IS JUST ANOTHER TYPE OF BREAKWATER



In simplest terms, a wave energy attenuation design:

- 1) Takes focused energy (waves) and breaks it up into many smaller units
- 2) Creates a destructive wave environment so that wave energies become out of phase.

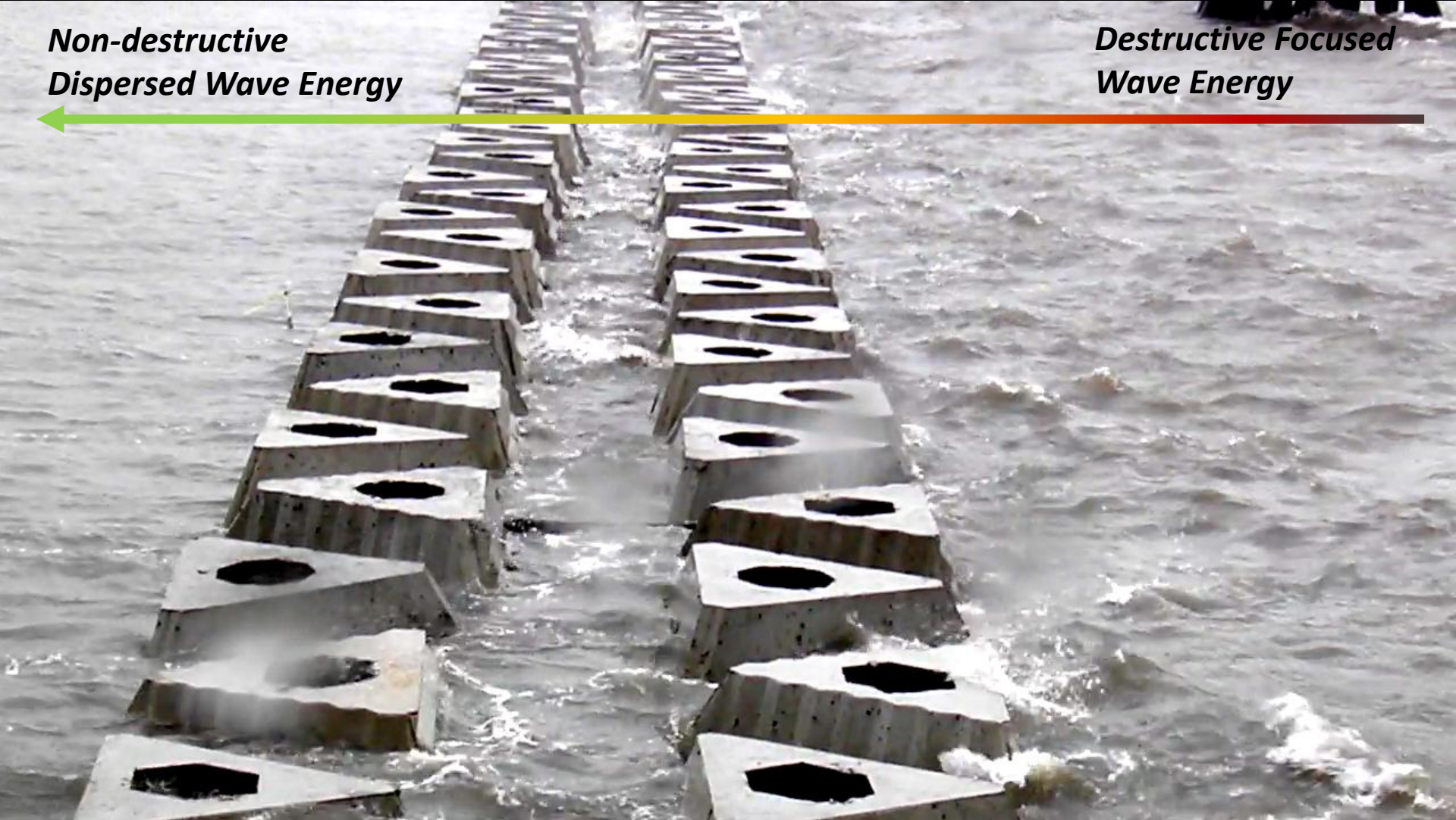
The net result is vastly reduced wave energy impacts and typically the creation of accretion zones.



#1 – A HYBRID ATTENUATING LIVING SHORELINE IS JUST ANOTHER TYPE OF BREAKWATER

*Non-destructive
Dispersed Wave Energy*

*Destructive Focused
Wave Energy*



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Energy still moving towards the shoreline, but in a non-destructive form.

#1 – A HYBRID ATTENUATING LIVING SHORELINE IS JUST ANOTHER TYPE OF BREAKWATER



MYTH BUSTED

QUICK POINT ABOUT ALL LIVING SHORELINES BEING THE SAME

They're not!



#2 – LIVING SHORELINES CAN'T WORK IN HIGH ENERGY SYSTEMS

- Conventional Living Shorelines cannot handle high energy systems.
- But when we talk about hybrids, ...well let's see.



#2 – LIVING SHORELINES CAN'T WORK IN HIGH ENERGY SYSTEMS



Dauphin Island, AL



Sunken Island, FL



#2 – LIVING SHORELINES CAN'T WORK IN HIGH ENERGY SYSTEMS

Cape Charles, VA



Cape Charles, VA

- WAD Deployment occurred just before Hurricane Sandy hit.
- Year 1 monitoring results.



Thank you LSS, Inc., Dade City, FL & Mid Atlantic Environmental LLC, Virginia Beach, VA for sharing photos monitoring photography



#2 – **HYBRID** LIVING SHORELINES CAN'T WORK IN HIGH ENERGY SYSTEMS

MYTH BUSTED

#3 – LIVING SHORELINES COST MORE THAN TRADITIONAL STRUCTURAL APPROACHES

	Conventional	Hybrids (structural)
• Center for Coastal Resources Management - VIMS	\$ 50 - \$100	\$150 - \$ 500
• Chesapeake Bay Foundation	\$ 50 - \$100	\$150 - \$1,200
• Partnership for the DE Est. (Brochure)	\$100 - \$225	\$250 - \$1,000
<i>PDE Brochure</i>	<i>Breakwaters/Bulkheads</i>	<i>\$450 - \$1,500</i>

Wave Energy Based Ranges

Low
\$50 - \$250

Moderate
\$175 - \$600

High
\$350 - \$1,000

Example Comparison

(Per 500 linear feet, 5 feet high)

WAD Array

Units 10 ft W x 5 ft H,
1.5 ft spacing, 2x row

Cost per linear foot, installed*: \$450 - \$600 (**\$500**)

Breakwater

5 ft H, 5 ft Crest, 2.5:1
slope F, 2.5:1 slope B

\$550 to \$800 (**\$670**)



#3 – LIVING SHORELINES COST MORE THAN TRADITIONAL STRUCTURAL APPROACHES

Other considerations:

Hybrids

Traditionals

- Maintenance Costs
- Access
- Geographic Location
- Equipment
- Local Contractors
- Nourishment/Accretion



#3 – LIVING SHORELINES COST MORE THAN TRADITIONAL STRUCTURAL APPROACHES



MYTH BUSTED

QUICK POINT ABOUT MONEY AND RESTORATION



#4 – THE ECOLOGICAL UPLIFT OF A HYBRID LS ISN'T ALL THAT DIFFERENT FROM TRADITIONAL APPROACHES

- **Supports LS Projects in Moderate to High Energy Systems**
- **Sediment Conservation**
- **Cost Saving for Dune and Nourishment Projects**
- **Infrastructure Protection**
- **Resilience – General and related to Climate change**
- **Reef Habitat**
- **Oyster Habitat**
- **Beach Stabilization for Horseshoe Crab**
- **Migratory Birds Habitat**
- **EFH Uplift**
- **Sea grass/SAV Restoration**
- **Improved Ecosystem Services**



#4 – THE ECOLOGICAL UPLIFT OF A HYBRID LIVING SHORELINE IS SIMILAR TO TRADITIONAL APPROACHES


<i>(Per 500 linear feet)</i>	WAD Array	Breakwater
General Description	Units 10 ft W x 5 ft H, 1.5 ft spacing, 2x row	5 ft H, 5 ft Crest, 2.5:1 slope F, 2.5:1 slope B
Wave Mechanism	Attenuation	Diffraction/Refraction/Reflection
SBC - Soft Bottom Coverage (ft ²)	2,435	13,750
NHS - New Hard Surface Area (ft ²)	49,098	14,850
SHS Index (SBC/NHS) (lower is better)	5.0%	92.6%
DDC - Dimensional Depth & Morphologic Character	5 feet, 3-D	0.75 feet, Planar



#4 – THE ECOLOGICAL UPLIFT OF A HYBRID LIVING SHORELINE IS SIMILAR TO TRADITIONAL APPROACHES



MYTH BUSTED



**Thank you for busting
myths with me**